PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-189048

(43)Date of publication of application : 10.07.2001

(51)Int.Cl. G11B 20/10
G11B 19/04
G11B 27/00

(21)Application number : 2000-036807

(22)Date of filing : 15.02.2000

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(30)Priority

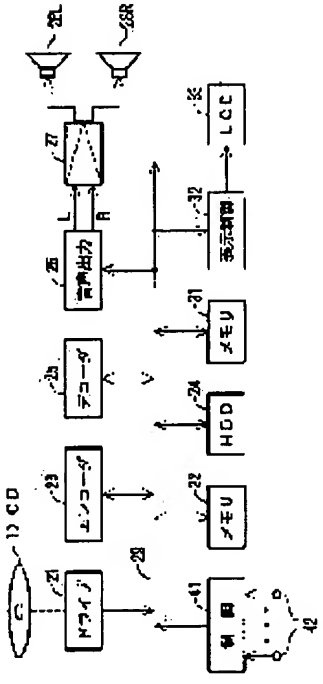
Priority number : 11297937 Priority date : 20.10.1999 Priority country : JP

(54) RECORDER

(57)Abstract:

PROBLEM TO BE SOLVED: To prevent a double copy when a CD is copied to an HDD.

SOLUTION: A control table is provided. The data of the TOC of the CD with the digital audio data written in the HDD 24 are written in the control table. When the CD 10 is reproduced by a CD drive device 21, and the digital audio data are written in the HDD 24, the control table is retrieved by the data of the TOC of the CD 10. When as the retrieval result, the data of the TOC of the CD 10 don't exist in the control table, the write-in to the HDD 24 is permitted. When as the retrieval result, the data of the TOC of the CD 10 exist in the control table, the write-in is prohibited.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to a recording device.
[0002]
[Description of the Prior Art] For example, if HDD is prepared in the audio equipment used carrying in a car and the contents of CD are copied to the HDD, CD to hear from CD changer etc. quickly can be discovered, and it can reproduce.
[0003] And the capacity of CD for music is about 760 M bytes (**44.1kHzx 16-bit x two-channel x 60-second x 74 minutes) in that case. Moreover, if a suitable data compression technique is used, the data compression of the digital audio data of CD can be carried out to about 1/10 capacity.
[0004] Therefore, since the data compression of the digital audio data can be carried out to about 80 M bytes per CD of one sheet of amount of data even if music is held in CD by full, if 8 G bytes of HDD is prepared, for example, CD of 100 or more sheets can be copied.
[0005] That is, if the data compression of the contents of CD is carried out to HDD and they are copied to it, compared with CD which can treat CD changer for mount at once being about ten sheets, much CD can be treated far. And then, the target CD can be chosen quickly as mentioned above, and it can reproduce.
[0006]
[Problem(s) to be Solved by the Invention] However, when the above systems are built and CD of no less than 100 sheets can be copied, the same CD may be copied twice accidentally. And in order to avoid such a trouble, a user needs to make a note of the identifier of copied CD, for example that there is no other way but to manage [which the user copied].
[0007] However, it is serious to manage CD of no less than 100 sheets, and the same CD may be copied twice after all.
[0008] This invention tends to solve such a trouble.
[0009]
[Means for Solving the Problem] A playback means to reproduce that digital data in this invention from the medium by which digital data and the retrieval information on this digital data are recorded, for example, While the above-mentioned digital data reproduced by this playback means is written in When writing the digital data from a record means by which the above-mentioned retrieval information is recorded on a managed table, and the above-mentioned playback means in the above-mentioned record means, When the above-mentioned managed table is searched using the above-mentioned retrieval information and there is no above-mentioned retrieval information in the above-mentioned managed table as a result of this retrieval When the writing to the above-mentioned record means of the digital data currently recorded on the above-mentioned medium is permitted and the above-mentioned retrieval information is shown in the above-mentioned managed table as a result of the above-mentioned retrieval It considers as the recording device which has the control circuit controlled to forbid the writing to the above-mentioned record means of the digital data currently recorded on the above-mentioned medium. Therefore, a copy with the medium for the second time to a recording device which already copied the contents to the recording device is forbidden.
[0010]
[Embodiment of the Invention] Drawing 1 is shown centering on audio signal Rhine about an example of the equipment by this invention.
[0011] That is, a sign 10 is CD with which musical digital audio data are recorded. In addition, in the case of CD with which this CD10 followed the specification of "CD text", data, such as the additional text of that CD10, for example, the title of CD10, and a player, are recorded by the R-W channel contained on the truck of the lead-in groove field of CD10.
[0012] And CD10 is played by CD drive equipment 21 which is a playback means, from this CD drive equipment 21, the digital audio data with which regeneration, such as a recovery and an error

correction, was performed are taken out, and this digital audio data is supplied to a bus line 29.
[0013] Moreover, while the memory 22 for buffers is connected, the encoder circuit 23 for data compressions is connected to a bus line 29. This encoder circuit 23 is constituted by DSP and carries out the data compression of the digital audio data reproduced from CD10 to the about 1/10 amount of data for example, by ATRAC processing (ATRAC is a trademark).
[0014] Furthermore, HDD24 is connected to a bus line 29 as a mass record means. This HDD24 is for storing the digital audio data (digital audio data after a data compression) of CD10, for example, has the capacity of 16 G bytes. Therefore, as mentioned above, about CD of at least 100 sheets, HDD24 will record the digital audio data by which the data compression was carried out, and can be reproduced.
[0015] Moreover, managed table 24T as shown in drawing 3 are prepared for HDD24 as one file. These managed table 24T hold the information and the written-in write-in location of each truck of CD10 for specifying CD10 of origin write-in [that] (write-in location in HDD24), when the data compression of the digital audio data of CD10 is carried out and they are stored or written in HDD24.
[0016] For this reason, 100 data column #1-#100 are prepared for managed table 24T. This each of data column #1-#100 corresponds to one sheet of CD with which digital audio data were recorded on HDD24, and #1-#100 are further used also as a CD number when choosing CD with which the contents were copied to HDD24.
[0017] And the cel of "TOC data", the "number of trucks", "the starting position and termination location" of a truck 1, "the starting position and termination location" of a truck 2, ..., "the starting position of the last truck and a termination location", and "the title of CD" is prepared for each of data column (CD number) #1-#100.
[0018] Here, while CD10 has the hour entry about that truck in TOC, generally these TOC differs every CD10. Then, it is used as data for the data of this TOC to specify or search CD10, and the data of that TOC are written in the cel of "TOC data" as retrieval information.
[0019] Furthermore, the total number of trucks of corresponding CD10 is written in the cel of "the number of trucks." Moreover, the write-in starting position and the write-in termination location in HDD24 of each truck (truck in CD10) are written in the cel of the starting position of a truck 1, and "termination location" - "the starting position of the last truck, and a termination location."
[0020] Moreover, the alphabetic data displayed as a title of CD10 at the time of the playback from HDD24 etc. is written in the cel of "the title of CD." For example, when CD10 is CD of the specification of CD text, the text currently recorded on the R-W channel of the lead-in groove field can be copied and written in.
[0021] Furthermore, a decoder circuit 25 and the voice output circuit 26 are connected to a bus line 29. In this case, a decoder circuit 25 is constituted by DSP and the encoder circuit 23 decodes the digital audio data by which the data compression is carried out by performing decoding of the complementation to the digital audio data of the basis before a data compression.
[0022] Moreover, when the voice output circuit 26 has a D/A converter circuit etc. and digital audio data are supplied, D/A conversion of this digital audio data is carried out to the analog audio signals L and R, and those audio signals L and R are supplied to the loudspeakers 28L and 28R of the left and a right channel through the output amplifier 27.
[0023] Furthermore, while the memory 31 and the display-control circuit 32 for buffers are connected, LCD33 is connected to the display-control circuit 32 as a display means, and it enables it to display various kinds of information on a bus line 29.
[0024] Moreover, a sign 41 is a control circuit which controls actuation of this whole equipment, and this is connected to the bus line 29 while it is constituted by the microcomputer. And the routine 100 shown in drawing 2 is prepared for this control circuit 41 as a part of program which that CPU performs. In addition, although later mentioned about the detail of this routine 100, only the part related to this invention is extracted and shown in drawing 2 .
[0025] Furthermore, the actuation key 42 constituted by the push switch of a non lock type as a means for a user to perform various kinds of alter operation is connected to the control circuit 41.

[0026] In such a configuration, when the microcomputer of a control circuit 41 performs a routine 100, the [usual playback of CD] and [record to HDD from CD] are performed as follows.
[0027] The [usual playback of CD] This is the case where play CD10 as it is and sound output is obtained like a common CD player.
[0028] Namely, if CD10 is set in CD drive equipment 21, processing of CPU of a control circuit 41 will start from step 101 of a routine 100, and then it will set to step 102. The data of TOC are read from CD10 by CD drive equipment 21, and through a bus line 29, the data of this read TOC are supplied to a control circuit 41, are saved, and serve as waiting for a key input from CD drive equipment 21 in step 103 continuously.
[0029] And since it is [the usual playback of CD] in now, if the playback key of the keys 42 is pressed, processing will progress to step 111 from step 103, and the key inputted at step 103 will be distinguished.
[0030] And since the playback key was pressed in now, processing progresses to step 112 from step 111, and the usual regeneration of CD10 is performed in this step 112.
[0031] That is, digital audio data are reproduced from CD10 by CD drive equipment 21, this digital audio data is supplied to the voice output circuit 26 through a bus line 29 from CD drive equipment 21, D/A conversion is carried out to audio signals L and R, and these audio signals L and R are supplied to Loudspeakers 28L and 28R through amplifier 27.
[0032] In this case, although the truck reproduced from CD10 follows assignment of a user, the data of TOC saved by step 102 in the control circuit 41 are then referred to. Furthermore, a track number, elapsed time, etc. of a truck under playback are displayed on LCD33 at the time of this playback.
[0033] And after ending playback of all the trucks that the user specified, processing progresses to step 119 and ends this routine 100.
[0034] Therefore, the equipment of drawing 1 can play CD10 like a common CD player.
[0035] [Record to HDD from CD] This is the case where carry out the data compression of the digital audio data in CD10, and it accumulates or writes in HDD24.
[0036] That is, if CD10 is set in CD drive equipment 21, as mentioned above, the data of TOC will be read from CD10, and it will be saved in a control circuit 41, and will become the waiting for a key input in step 103 after that.
[0037] And since it is [record to HDD from CD] in now, if the copy key of the keys 42 is pressed, processing will progress to step 111 from step 103, and the key inputted at step 103 will be distinguished.
[0038] Then, since the copy key was pressed in now, processing makes a search term the data of TOC which progressed to step 121 and was read from step 111 by step 102 in this step 121, and the data of the cel of the "TOC data" of managed table 24T are searched.
[0039] And next, the retrieval result of step 121 is distinguished in step 122, when there are no data of TOC read by step 102 in the cel of the "TOC data" of managed table 24T, processing progresses to step 123 from step 122, and CD10 is copied to HDD24 in this step 123.
[0040] That is, digital audio data are reproduced from CD10 by CD drive equipment 21, and while this digital audio data is once written in memory 22 through a bus line 29 from CD drive equipment 21, it is read from memory 22 to predetermined timing. And this read digital audio data is supplied to the encoder circuit 23 through a bus line 29, a data compression is carried out by ATRAC processing, and this digital audio data by which the data compression was carried out is supplied to HDD24 through a bus line 29. In this way, the digital audio data of CD10 are written in HDD24, where a data compression is carried out.
[0041] Moreover, the information on copied CD10 and a truck (truck in CD10) is registered into managed table 24T of HDD24 at this time. That is, if the copy of CD10 is the n-th (one of n=1-100), the data of TOC which read from CD10 to the cel of the "TOC data" of the column of CD number #n of managed table 24T by step 102, and were saved in the control circuit 41 will be written in. Moreover, the number of trucks of CD10 is written in the cel of the "number of trucks" of the column of CD number #n.

[0042] Furthermore, a write-in starting position and a write-in termination location when the digital audio data of CD10 are written in HDD24 are written in the cel which corresponds among the cels of the starting position of a truck 1, and "termination location" - "the starting position of the last truck, and a termination location" for every truck of the CD10. [of the column of CD number #n]
[0043] Moreover, when the text about CD10, a truck, etc. was inputted from the key 42, and the alphabetic data is once saved in memory 31 and ends the copy of CD10, it is read from memory 31 and written in the cel of the "title" of the column of CD number #n of managed table 24T. In addition, when CD10 is CD text, the text added to CD10 is also written in.
[0044] In this way, if the contents of CD10 are written in HDD24, managed table 24T will be updated corresponding to this.
[0045] And after ending the above processing, processing progresses to step 119 from step 123, and ends this routine 100.
[0046] Therefore, when a certain CD10 is not copied to HDD24 yet, while that CD10 is copied to HDD24, the information which specifies that CD10 will also be registered into managed table 24T of HDD24 at this time.
[0047] On the other hand, when the data of TOC read by step 102 are in the cel of the "TOC data" of managed table 24T in step 122 Processing progresses to step 131 from step 122, and it sets to this step 131. The character string of the cautions sentence which shows that predetermined data are supplied to the display-control circuit 32 through a bus line 29 from a control circuit 41, consequently CD10 which it was going to copy is already copied to HDD24 at LCD33 as shown in drawing 4 is displayed.
[0048] Then, it progresses to step 132, CD10 is ejected from CD drive equipment 21 according to the directions from a control circuit 41, and processing ends this routine 100 by step 119 after that.

[0049] [Playback from HDD] This is the case where the contents of CD copied to HDD24 are reproduced. In addition, the manipulation routine for this playback is not illustrating.
[0050] If the playback from HDD24 is directed by the key 42, data will be read from the cel of the "title" of the data column in which registration is performed among data column #1-#100 of managed table 24T. Namely, this data, The corresponding data of CD number #n are supplied to the display-control circuit 32, consequently a conversion table with a "title" is displayed on LCD33 as CD number #n.
[0051] Then, when CD number #m which operates and wishes a key 42 is inputted, the data currently written in those cels are read from the cel of managed table 24 "number of trucks" - "a title", and it is once saved in a control circuit 41. [of the column of CD number #m of T]
[0052] And by using the data saved in this control circuit 41 like the data of TOC in which it is written by CD, the digital audio data corresponding to the contents of CD of CD number #m are read from HDD24, and are henceforth outputted as a sound.
[0053] In this case, if digital audio data are read from HDD24, this will be supplied to the voice output circuit 26, after data elongation is carried out and the buffer of this digital audio data by which data elongation was carried out is carried out to the digital audio data of after a buffer is carried out by memory 22 even if a decoder circuit 25 is supplied, by memory 22. Therefore, from Loudspeakers 28L and 28R, the playback sound of the digital audio data read from HDD24 is outputted.
[0054] Moreover, a track number, elapsed time, etc. of a truck (truck of CD) under playback are displayed on LCD33 also at the time of the playback from this HDD24.
[0055] [Conclusion] As mentioned above, when copying the contents of CD10 to HDD24 in the regenerative apparatus of drawing 1 , only when not copied, it is still made to confirm whether the CD10 is already copied by referring to managed table 24T, and to perform a copy. Therefore, what it can prevent copying the same CD twice accidentally, for example, consumes the capacity of HDD24 vainly is lost.
[0056] And then, a user does not need to manage whether a certain CD is copied to HDD24, and a

double copy can be prevented automatically.
[0057] moreover, finishing [this / a certain CD / the copy to HDD24] -- it is -- the time of a ******** not being known -- that CD -- CD drive equipment 21 -- setting -- the key stroke of a copy -- then, finishing [it is good, and / the copy to HDD24 is performed and / a copy] still if it has not copied -- it is -- if -- that is displayed and the copy of a duplex is not performed at this time.
[0058] A deer therefore does not need special hardware that what is necessary is just to prepare managed table 24T for HDD24, either.
[0059] Furthermore, since the text of arbitration can be written in, when CD is copied to HDD24, a title original with the copy etc. can be attached to the cel of the "title" of managed table 24T.
[0060] [Others] In the routine 100 of drawing 5 , when CD10 is already copied to HDD24, it is the case where the contents of CD10 which step 133 was performed following step 132 and it was going to copy are reproduced from HDD24.
[0061] Therefore, when it is going to copy again CD already copied to HDD24 in this case, while this is warned by the display in LCD33, it can check also with a playback sound.
[0062] Moreover, in ****, the information written in the cel of the "title" of managed table 24T is good to collect into another opportunity after the copy of HDD24, to be able to write in, and to write in the time copied at the time of copy termination of the contents of CD by the default in that case.
[0063] Furthermore, the information written in the cel of a "title" can also be written in the memory of a non-volatile. Moreover, when playing CD10 and copying the contents to HDD24, the reproduction speed can be made into a high speed rather than a criterion. Furthermore, managed table 24T should just show the correspondence relation between the data of TOC, and the digital audio data written in HDD24.
[0064]
List of the abbreviations currently used on these specifications ATRAC:Adaptive TRansform Acoustic Coding CD : Compact Disc CPU :Central Processing Unit D/A : Digital to Analog HDD : Hard Disk Drive; hard disk drive equipment LCD : Liquid Crystal Display; liquid crystal display TOC : Table Of Contents [0065]
[Effect of the Invention] According to this invention, being able to prevent copying the same CD twice accidentally, for example, consuming the capacity of HDD vainly is lost. And then, a user does not need to manage whether a certain CD is copied to HDD, and a double copy can be prevented automatically.
[0066] Moreover, that what is necessary is just to operate a copy about the CD, a copy is performed, and when it does not know whether a certain CD is copy ending, if it has not copied, if it is copy ending, the copy of a duplex will not be performed yet. A deer therefore does not need special hardware that what is necessary is just to prepare a managed table for HDD, either.